



Broad Agency Announcement  
Fast Access Spacecraft Testbed (FAST)  
Tactical Technology Office

BAA 07-65

November 20, 2007

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## Part One: Overview Information

- **Federal Agency Name** - Defense Advanced Research Projects Agency (DARPA), Tactical Technology Office (TTO)
- **Funding Opportunity Title** – FAST (Fast Access Spacecraft Testbed)
- **Announcement Type** – Initial Announcement
- **Funding Opportunity Number** – Broad Agency Announcement (BAA) 07-65
- **Catalog of Federal Domestic Assistance Numbers (CFDA)** – Not Applicable
- **Dates**
  - Proposal Due Date – January 18, 2008
  - BAA Release – November 20, 2007
- **Anticipated individual awards** – Multiple awards are anticipated.
- **Types of instruments that may be awarded** - Procurement contract or Other Transaction for Prototype.
- **Any cost sharing requirements** - None
- **Agency contact**
  - Technical Point of Contact (POC) – Lt Col Fred Kennedy, USAF
  - Contractual Point of Contact (POC) – Mr. Christopher Glista

DARPA/TTO  
ATTN: BAA 07-65  
3701 North Fairfax Drive  
Arlington, VA 22203-1714  
EMAIL: [BAA07-65@darpa.mil](mailto:BAA07-65@darpa.mil)

## Part Two: Full Text of Announcement

### 1.0 Funding Opportunity Description

The Defense Advanced Research Projects Agency often selects its research efforts through the Broad Agency Announcement (BAA) process. The BAA will appear first on the FedBizOpps website, <http://www.fedbizopps.gov/>. The following information is for those wishing to respond to the BAA.

The goal of the FAST program is to develop and demonstrate a High Power Generation Subsystem (HPGS) that, when combined with state-of-the-art electric propulsion systems, will form the technological basis for a light weight, high power, highly mobile spacecraft platform, generating as much as 50-80 kW for operational users, but at high specific power levels (130 W/kg or better). The FAST HPGS would also greatly enhance the performance of historically “power-starved” payloads, such as communications or radar.

The current means to achieve mobility on-orbit involves relatively low specific impulse ( $I_{sp}$ ) chemical mono- and bipropellants. These stored energy systems require relatively high propellant mass to achieve significant maneuverability. High-  $I_{sp}$  electric propulsion has long been advanced as an efficient alternative, but, since this efficiency comes at a high price (high power and substantial parasitic mass) such systems have been used primarily for stationkeeping or exploration missions that do not impose stringent time limits on transfers between orbits. Most implementations of electric propulsion to date have relied on relatively low levels of electrical power input, which severely impacts responsiveness.

The FAST program will demonstrate that high specific power subsystems, using a combination of moderate-to-high levels of solar flux concentration, high-flux capable solar photovoltaic cells, efficient power management and distribution, and innovative heat rejection schemes, will permit spacecraft to perform significant maneuvers with electric propulsion in much shorter time spans, increasing their military utility.

Such a system can form the basis for a paradigm-shift in spacecraft mission design, enabling an affordable launch to LEO with self-transfer to GEO, while retaining sufficient maneuverability in GEO to perform flexible mission scenarios including numerous sorties. The FAST system is intended to enable highly responsive on-orbit servicing architectures, on-orbit space situational awareness capabilities, and remove power constraints from payloads such as ultra wide-bandwidth communications or radar.

Achievement of these performance goals will likely rely on ultra lightweight, stowable concentration schemes with areal densities on the order of 0.5 kg/m<sup>2</sup>. Solar cells will have to survive continuously in high solar flux environments (40:1 to 100:1 concentration ratio), and possibly at greatly elevated temperatures. Power management and distribution systems will have to be designed to efficiently route and store energy, possibly at higher voltages and at higher ambient temperatures. Heat rejection systems will have to address the substantial amount of

energy (potentially hundreds of kilowatts) that must be radiated away from the FAST spacecraft to maintain thermal equilibrium. Pointing requirements will be substantially tighter in highly-concentrated systems than in conventional “one-sun” systems.

Phase 1 will consist of the detailed design and development of a ground test demonstration of FAST’s power subsystem in a relevant environment. This ground demonstration should include all elements of the high power generation subsystem (HPGS), including solar concentration and collection, power conversion and distribution, heat rejection, structures and deployment devices, sun pointing and tracking capability. The Phase I effort will also assess HPGS interfaces with prospective payloads and propulsion systems. Phase 2 will include the fabrication, assembly and end-to-end testing of the prototype HPGS in a relevant (i.e., simulated space) environment.

DARPA seeks innovative proposals addressing the following **Technical Areas**:

- Solar energy concentration
- Lightweight structures
- Heat rejection technologies
- High-efficiency power distribution and management
- High flux solar arrays

Further technical descriptions and details are provided in Section 8.0.

## **2.0 Award Information**

Multiple awards are anticipated. The amount of resources made available under this BAA will depend on the quality of the proposals received and the availability of funds.

The Government reserves the right to select for negotiation all, some, one, or none of the proposals received in response to this solicitation, and to make awards without discussions with offerors. The Government also reserves the right to conduct discussions if the Source Selection Authority later determines them to be necessary. If warranted, portions of resulting awards may be segregated into pre-priced options. Additionally, DARPA reserves the right to accept proposals in their entirety or to select only portions of proposals for award. In the event that DARPA desires to award only portions of a proposal, negotiations may be opened with that offeror. The Government reserves the right to fund proposals in phases with options for continued work at the end of one or more of the phases.

Awards under this BAA will be made to offerors on the basis of the evaluation criteria listed below (see section labeled “Application Review Information”, Section 5.0.), and program balance to provide overall best value to the Government. Proposals identified for negotiation may result in a procurement contract or Other Transaction for Prototype depending upon the nature of the work proposed, the required degree of interaction between parties, and other factors. Offerors should note that the required degree of interaction between parties, regardless of award instrument, will be high and continuous.

### **2.1 Period of Performance**

The period of performance for the effort will start approximately May, 2008. It is envisioned that Phase 1 will last from six (6) to eight (8) months. Twelve (12) months is the envisioned duration of Phase 2. Offerors should consider the notional schedule provided above as general guidance. A period of performance should be proposed that offerors consider realistic and reasonable for completion of the proposed work in view of this guidance.

## **3.0 Eligibility Information**

### **3.1 Eligible Applicants**

All responsible sources capable of satisfying the Government's needs may submit a proposal that shall be considered by DARPA. Historically Black Colleges and Universities (HBCUs), Small Businesses, Small Disadvantaged Businesses and Minority Institutions (MIs) are encouraged to submit proposals and join others in submitting proposals; however, no portion of this announcement will be set aside for these organizations' participation due to the impracticality of reserving discrete or severable areas of this research for exclusive competition among these entities. Independent proposals from Government/National laboratories may be subject to applicable direct competition limitations, though certain Federally Funded Research and Development Centers are excepted per P.L. 103-337§ 217 and P.L 105-261 § 3136. Proposers from Government/ National Laboratories must provide documentation to DARPA to establish that they are eligible to propose and have unique capabilities not otherwise available in private industry.

Foreign participants and/or individuals may participate to the extent that such participants comply with any necessary Non-Disclosure Agreements, Security Regulations, Export Control Laws, and other governing statutes applicable under the circumstances.

#### **3.1.1 Procurement Integrity, Standards of Conduct, Ethical Considerations, and Organizational Conflicts of Interest**

Certain post-employment restrictions on former federal officers and employees may exist, including special Government employees (including but not limited to, Title 18, Section 207 United States Code, the Procurement Integrity Act, 41 U.S.C. 423, and FAR 3.104.) Current federal employees are prohibited from participating in particular matters involving conflicting financial, employment, and representational interests (18 USC 203, 205, and 208.)

All Proposers and proposed subcontractors must affirm whether they are providing scientific, engineering, and technical assistance (SETA) or similar support to any DARPA technical office(s) through an active contract or subcontract. All affirmations must state which office(s) the Proposer supports and identify the prime contract numbers. Affirmations shall be furnished at the time of proposal submission. All facts relevant to the existence or potential existence of organizational conflicts of interest (FAR 9.5) must be disclosed. The disclosure shall include a description of the action the Proposer has taken or proposes to take to avoid, neutralize, or mitigate such conflict. In accordance with FAR 9.503 and without prior approval or a waiver from the DARPA Director, a Contractor cannot simultaneously be a SETA and Performer. Proposals that fail to fully disclose potential conflicts of interests and/or do not have plans to mitigate this conflict will be returned without technical evaluation and withdrawn from further consideration for award.



If a prospective Proposer believes that any conflict of interest exists or may exist (whether organizational or otherwise), the Proposer should promptly raise the issue with DARPA by sending Proposer's contact information and a summary of the potential conflict by email to the mailbox address for this BAA at BAA07-65@darpa.mil, before time and effort are expended in preparing a proposal and mitigation plan. If, in the sole opinion of the Government after full consideration of the circumstances, any conflict situation cannot be effectively mitigated, the proposal may be returned without technical evaluation and withdrawn from further consideration for award under this BAA.

### **3.2 Cost Sharing and Matching**

Cost sharing is not required for this particular program; however, cost sharing will be carefully considered where there is an applicable statutory condition relating to the selected funding instrument (e.g., for any Other Transactions under the authority of 10 U.S.C. § 2371). Cost sharing is encouraged where there is a reasonable probability of a potential commercial application related to the proposed research and development effort.

### **3.3 Other Eligibility Criteria**

#### **3.3.1 Collaborative Efforts**

Collaborative efforts/teaming are encouraged. Specific content, communications, networking, and team formation are the sole responsibility of the participants.

## **4.0 Application and Submission Information**

### **4.1 Address to Request Application Package**

This announcement contains all information required to submit a proposal. No additional forms, kits, or other materials are needed. This notice constitutes the total BAA. No additional information is available, nor will a formal Request for Proposal (RFP) or additional solicitation regarding this announcement be issued. Requests for same will be disregarded.

### **4.2 Content and Form of Application Submission**

Contractor teams should include activities and costs for both Phase 1 and Phase 2 within their proposals.

#### **4.2.1 Proposal Information**

The typical proposal should express a consolidated effort in support of one or more related technical concepts or ideas. Disjointed efforts should not be included into a single proposal.

Restrictive notices notwithstanding, proposals may be handled, for administrative purposes only, by a support contractor. This support contractor is prohibited from competition in DARPA technical research and is bound by appropriate nondisclosure requirements. Proposals may not be submitted by fax or e-mail; any so sent will be disregarded.

Proposals not meeting the format described in the BAA may not be reviewed.

Proposers must submit an original and five (5) copies of the full proposal and one (1) electronic copy of the full proposal [in PDF (preferred)] on a CD-ROM. Each hard copy must be clearly labeled with BAA07-65, proposer organization, proposal title (short title recommended), and Copy \_ of 5.

All administrative correspondence and questions on this solicitation, including requests for information on how to submit a full proposal to this BAA, should be directed to the administrative address below; e-mail is preferred.

BAA07-65  
DARPA/TTO  
3701 North Fairfax Drive  
Arlington, VA, 22203-1716  
EMAIL: [BAA07-65@darpa.mil](mailto:BAA07-65@darpa.mil)

DARPA intends to use electronic mail for correspondence regarding BAA07-65. Any correspondence sent by fax will be disregarded.

#### **4.2.2 Proposal Format**

All proposals must be in the format given below. Nonconforming proposals may be rejected without review. Proposals shall consist of two volumes. All pages shall be printed on 8-1/2 by 11 inch paper with type not smaller than 12 point, however, 10 point font may be used inside graphs, tables, and figures. The page limitation for full proposals includes all figures, tables, and charts. Volume I, Technical and Management Proposal, may include an attached bibliography of relevant technical papers or research notes (published and unpublished) which document the technical ideas and approach upon which the proposal is based. Copies of not more than three (3) relevant papers can be included with the submission. The bibliography and attached papers are not included in the page counts given below. The submission of other supporting materials along with the proposals is strongly discouraged and will not be considered for review. Except for the attached bibliography and Section I, Volume I shall not exceed fifty (50) number pages. All full proposals must be written in English.

### 4.2.3 Volume I, Technical and Management Proposal

#### Section I. Administrative

- A. Cover sheet to include:
- (1) BAA number
  - (2) Technical area
  - (3) Lead Organization Submitting proposal
  - (4) Type of business, selected among the following categories: “LARGE BUSINESS”, “SMALL DISADVANTAGED BUSINESS”, “OTHER SMALL BUSINESS”, “HBCU”, “MI”, “OTHER EDUCATIONAL”, OR “OTHER NONPROFIT”
  - (5) Contractor’s reference number (if any)
  - (6) Other team members (if applicable) and type of business for each
  - (7) Proposal title
  - (8) Technical point of contact to include: salutation, last name, first name, street address, city, state, zip code, telephone, fax (if available), electronic mail (if available)
  - (9) Administrative point of contact to include: salutation, last name, first name, street address, city, state, zip code, telephone, fax (if available), electronic mail (if available), total funds requested from DARPA, and the amount of cost share (if any) and
  - (10) Date proposal was submitted.
- B. Official transmittal letter.

#### Section II. Summary of Proposal

This section provides an overview of the proposed work as well as an introduction to the associated technical and management issues. Further elaboration will be provided in Section 8.0.

- A. Innovative claims for the proposed research. This section is the centerpiece of the proposal and should succinctly describe the uniqueness and benefits of the proposed approach relative to the current state-of-art alternate approaches.
- B. Deliverables associated with the proposed research and the plans and capability to accomplish technology transition and commercialization. Include in this section all proprietary claims to the results, prototypes, intellectual property, or systems supporting and/or necessary for the use of the research, results, and/or prototype. If there are not proprietary claims, this should be stated.
- C. Cost, schedule and milestones for the proposed research, including estimates of cost for each task in each Phase of the effort delineated by the prime and major subcontractors, total cost and company cost share, if applicable. **Note: Measurable critical milestones should occur every 2 (two) to 3 (three) months after start of effort.** These milestones should enable and support a go/no go decision for the next part of the effort. Additional interim non-critical management milestones are also highly encouraged at a regular interval.

- D. Technical rationale, technical approach, and constructive plan for accomplishment of technical goals in support of innovative claims and deliverable production. (In the full proposal, this section should be supplemented by a more detailed plan in Section III.)
- E. General discussion of other research in this area.
- F. A clearly defined organization chart for the program team which includes, as applicable: (1) the programmatic relationship of team member; (2) the unique capabilities of team members; (3) the task of responsibilities of team members; (4) the teaming strategy among the team members; and (5) the key personnel along with the amount of effort to be expended by each person during each year.

### Section III. Detailed Proposal Information

This section provides the detailed discussion of the proposed work necessary to enable an in-depth review of the specific technical and managerial issues. Specific attention must be given to addressing both risk and payoff of the proposed work that make it desirable to DARPA.

- A. Statement of Work (SOW) - In plain English, clearly define the technical tasks/subtasks to be performed, their durations, and dependencies among them. The page length for the SOW will be dependant on the amount of the effort. For each task/subtask, provide:
  - A general description of the objective (for each defined task/activity);
  - A detailed description of the approach to be taken to accomplish each defined task/activity);
  - Identification of the primary organization responsible for task execution (prime, sub, team member, by name, etc.);
  - The exit criteria for each task/activity - a product, event or milestone that defines its completion.
  - Define all deliverables (reporting, data, reports, software, etc.) to be provided to the Government in support of the proposed research tasks/activities.

*Note: It is recommended that the SOW should be developed so that each Phase of the program is separately defined. Do not include any proprietary information in the SOW.*

- B. Description of the results, products, transferable technology, and expected technology transfer path enhancing that of Section II. B. See also Section 6.2.2 "Intellectual Property."
- C. Detailed technical rationale enhancing that of Section II.
- D. Detailed technical approach enhancing and completing that of Section II.
- E. Comparison with other ongoing research indicating advantages and disadvantages of the proposed effort.
- F. Discussion of proposer's previous accomplishments and work in closely related research areas.
- G. Description of the facilities that would be used for the proposed effort.
- H. Detail support enhancing that of Section II, including formal teaming agreements which are required to execute this program.

- I. Cost schedules and milestones for the proposed research, including estimates of cost for each task in each year of the effort delineated by the primes and major subcontractors, total cost, and any company cost share. **Note: Measurable critical milestones should occur every 2 (two) to 3 (three) months after start of effort.** These milestones should enable and support a go/no go decision for the next part of the effort. Additional interim non-critical management milestones are also highly encouraged at regular intervals. Where the effort consists of multiple portions which could reasonably be partitioned for purposes of funding, these should be identified as options with separate cost estimates for each. Additionally, proposals should clearly explain the technical approach(es) that will be employed to meet or exceed each program metric and provide ample justification as to why the approach(es) is/are feasible.

Proposers should use a program work outline or Work Breakdown Structure (WBS) and common numbering system to integrate the proposal documents, including an Integrated Master Schedule (IMS). The IMS and cost proposal numbering should be completed to at least level 3 and in detail sufficient to highlight the significant points discussed throughout the proposal and within the WBS budget allocation.

#### Section IV. Additional Information

A brief bibliography of relevant technical papers and research notes (published and unpublished) which document the technical ideas upon which the proposal is based. Copies of not more than three (3) relevant papers can be included in the submission.

#### **4.2.4 Volume II, Cost Proposal**

Cover sheet to include:

- (1) BAA number;
- (2) Technical area;
- (3) Lead Organization Submitting proposal;
- (4) Type of business, selected among the following categories: “LARGE BUSINESS”, “SMALL DISADVANTAGED BUSINESS”, “OTHER SMALL BUSINESS”, “HBCU”, “MI”, “OTHER EDUCATIONAL”, OR “OTHER NONPROFIT”;
- (5) Contractor’s reference number (if any);
- (6) Other team members (if applicable) and type of business for each;
- (7) Proposal title;
- (8) Technical point of contact to include: salutation, last name, first name, street address, city, state, zip code, telephone, fax (if available), electronic mail (if available);
- (9) Administrative point of contact to include: salutation, last name, first name, street address, city, state, zip code, telephone, fax (if available), and electronic mail (if available);
- (10) Award instrument requested: cost-plus-fixed-fee (CPFF), cost-contract—no fee, cost sharing contract – no fee, or other type of procurement contract, cooperative agreement, or other transaction;
- (11) Place(s) and period(s) of performance;

- (12) Total proposed cost separated by basic award and option(s) (if any);
- (13) Name, address, and telephone number of the Proposer's cognizant Defense Contract Management Agency (DCMA) administration office (*if known*);
- (14) Name, address, and telephone number of the Proposer's cognizant Defense Contract Audit Agency (DCAA) audit office (*if known*);
- (15) Date proposal was prepared;
- (16) DUNS number;
- (17) TIN number; and
- (18) Cage Code;
- (19) Subcontractor Information; and
- (20) Proposal validity period.

Detailed cost breakdown to include: (1) total program cost for Phase 1 broken down by major cost items (direct labor, including labor categories; subcontracts; materials; other direct costs, overhead charges, etc.) and further broken down by sub-tasks; (2) major program tasks by year; (3) an itemization of major subcontracts and equipment purchases; (4) an itemization of any information technology (IT) purchase<sup>1</sup>; (5) a summary of projected funding requirements by month; and (6) the source, nature, and amount of any industry cost-sharing; and (7) identification of pricing assumptions that may require incorporation into the resulting award instrument (e.g., use of Government Furnished Property/Facilities/Information, access to Government Subject Matter Expert/s, etc.). Costs for Phase 2 shall be proposed as an Option adhering to the format provided above for Phase 1. NOTE: for IT and equipment purchases, include a letter stating why the Proposer cannot provide the requested resources from its own funding.

Supporting cost and pricing information in sufficient detail to substantiate the summary cost estimates in B. above. Include a description of the method used to estimate costs and supporting documentation. Note: "cost or pricing data" as defined in FAR Subpart 15.4 shall be required if the Proposer is seeking a procurement contract award of \$650,000 or greater unless the Proposer requests an exception from the requirement to submit cost of pricing data. "Cost or pricing data" are not required if the Proposer proposes an award instrument other than a procurement contract (e.g., a cooperative agreement, or other transaction.) All proprietary subcontractor proposal documentation, prepared at the same level of detail as that required of the prime, shall be made immediately available to the Government, upon request, under separate cover (i.e., mail, electronic/email, etc.), either by the Proposer or by the subcontractor organization.

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<sup>1</sup>IT is defined as "any equipment, or interconnected system(s) or subsystem(s) of equipment that is used in the automatic acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information by the agency. (a) For purposes of this definition, equipment is used by an agency if the equipment is used by the agency directly or is used by a contractor under a contract with the agency which – (1) Requires the use of such equipment; or (2) Requires the use, to a significant extent, or such equipment in the performance of a service or the furnishing of a product. (b) The term "information technology" includes computers, ancillary, software, firmware and similar procedures, services (including support services), and related resources. (c) The term "information technology" does not include – (1) Any equipment that is acquired by a contractor incidental to a contract; or (2) Any equipment that contains imbedded information technology that is used as an integral part of the product, but the principal function of which is not the acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information. For example, HVAC (heating, ventilation, and air conditioning) equipment such as thermostats or temperature control devices, and medical equipment where information technology is integral to its operation, are not information technology."

### **4.3 Submission Dates and Times**

The full proposal (original and designated number of hard and electronic copies) must be submitted to DARPA on or before 4:00 p.m., local time, Arlington, VA, on January 18, 2008, in order to be considered during the initial evaluation phase, however, BAA 07-65 will remain open through November 20, 2008. Although the Government may select proposals for award at any time during this period, it is anticipated that the majority of funding for this program will be committed during the initial selections. Proposals may be submitted at any time from issuance of this announcement through November 20, 2008; however, proposers are warned that the likelihood of funding is greatly reduced for proposals submitted after the initial closing date deadline.

DARPA will acknowledge receipt of complete submissions via email and assign control numbers that should be used in all further correspondence regarding proposals. Failure to comply with the submission procedures may result in the submission not being evaluated.

### **4.4 Intergovernmental Review (Not Applicable)**

### **4.5 Funding Restrictions (Not Applicable)**

## **5.0 Application Review Information**

### **5.1 Evaluation Criteria**

Evaluation of proposals will be accomplished through a scientific/technical review of each proposal using the following criteria, in order of descending importance: (a) Technical Approach; (b) Reasonableness and Realism of Proposed Schedule; (c) Proposer's Capabilities and Related Experience; and (d) Cost Reasonableness and Realism. Proposals will not be evaluated against each other since they are not submitted in accordance with a common work statement. DARPA's intent is to review proposals as soon as possible after they arrive; however, proposals may be reviewed periodically for administrative reasons. The following are descriptions of the above listed criteria:

#### **5.1.1 Technical Approach**

The proposed technical approach is feasible, achievable, comprehensive, and supported by a proposed technical team that has the expertise and experience to accomplish the proposed tasks.

Task descriptions and associated technical elements provided are complete and in a logical sequence with all proposed deliverables clearly defined such that a final product that achieves the goal can be expected as a result of award. The proposal identifies major technical risks and planned mitigation efforts are clearly defined and feasible.

The proposal must describe an approach to designing, developing, fabricating, assembling, and testing a demonstration High Power Generation Subsystem (HPGS) in a simulated space

environment, capable of producing 20 kW of electrical power at a subsystem specific power ( $\alpha$ ) of 130 W/kg or better. The calculation of the HPGS  $\alpha$  must include:

1. Solar power collection elements, including concentration mechanisms.
2. Solar power conversion elements.
3. Electrical power management and distribution systems, assuming payload line voltage requirements of no less than 100 V.
4. Heat rejection elements required to dissipate waste heat produced in the conversion of sunlight to electricity in the space environment.
5. All supporting structures, including pointing and deployment mechanisms and sensors.

The proposal must describe how the HPGS could be used to support both electrical propulsion and spacecraft payload power requirements. The proposal must demonstrate how the 20 kW HPGS demonstrator scales to notional operational systems with power requirements of 50-80 kW or more.

The proposed development process must include, over time, a distinct set of measurable criteria along the path to completion.

### **5.1.2 Reasonableness and Realism of Proposed Schedule**

The proposal must describe how the team will aggressively pursue the development of a 20 kW, 130 W/kg HPGS demonstration in the shortest timeframe consistent with its assessment of existing or near-term technology development, and to accurately account for that timeframe. The proposal must also demonstrate the team's ability to understand, identify, and mitigate all potential risks to schedule.

### **5.1.3 Proposer's Capabilities and Related Experience**

The proposer's prior experience in similar efforts must clearly demonstrate an ability to deliver products that meet the proposed technical performance within the proposed budget and schedule. The proposed team has the expertise to manage the cost and schedule. Similar efforts completed/ongoing by the proposer in this area are fully described including identification of other Government sponsors. Each proposal will be evaluated for:

- Program Team and Key Personnel
- Facilities and Corporate Capabilities
- Past Performance



#### **5.1.4 Cost Reasonableness and Realism**

The objective of this criterion is to establish that the proposed costs are realistic for the technical and management approach offered, as well as to determine the proposer's practical understanding of the effort. This will be principally measured by cost per labor-hour and number of labor-hours proposed. The evaluation criterion recognize that undue emphasis on cost may motivate proposers to offer low-risk ideas with minimum uncertainty and to staff the effort with junior personnel in order to be in a more competitive posture. DARPA discourages such cost strategies. Cost reduction approaches that will be received favorably include innovative management concepts that maximize direct funding for technology and limit diversion of funds into overhead.

Each proposal will be evaluated for:

- Affordability, including any private cost-sharing arrangements.
- Potential impact of Intellectual Property Restrictions on long term program affordability
- Cost realism and credibility of estimates.
- Schedule realism based on length and cost, where shorter schedules are preferred when all other factors are equal.
- Budget allocations for each task substantiate the scope of work identified.
- Facility, laboratory, and other non-labor costs are identified and considered.
- Costs in Phases 1 and 2 associated solely with the demonstration payload are clearly and separately identified.
- Assumptions and their cost impact as to any Government Furnished Equipment (GFE) and services are clearly identified.

After selection and before award the contracting officer will negotiate cost/price reasonableness.

Award(s) will be made to proposers whose proposals are determined to be the most advantageous to the Government, all factors considered, including the potential contributions of the proposed work to the overall research program and the availability of funding for the effort. Award(s) may be made to any proposer(s) whose proposal(s) is determined selectable regardless of its overall rating.

**NOTE: PROPOSERS ARE CAUTIONED THAT EVALUATION RATINGS MAY BE LOWERED AND/OR PROPOSALS REJECTED IF SUBMITTAL INSTRUCTIONS ARE NOT FOLLOWED.**

#### **5.2 Review and Selection Process**

It is the policy of DARPA to ensure impartial, equitable, comprehensive proposal evaluations and to select the source (or sources) whose offer meets the Government's technical, policy, and programmatic goals. Pursuant to FAR 35.016, the primary basis for selecting proposals for acceptance shall be technical, importance to agency programs, and fund availability. In order to

provide the desired evaluation, qualified Government personnel will conduct reviews and (if necessary) convene panels of experts in the appropriate areas.

Proposals will not be evaluated against each other since they are not submitted in accordance with a common work statement. DARPA's intent is to review proposals as soon as possible after they arrive; however, proposals may be reviewed periodically for administrative reasons. For evaluation purposes, a proposal is the document described in "Proposal Information", Section 4.2.1. Other supporting or background materials submitted with the proposal will be considered for the reviewer's convenience only and not considered as part of the proposal.

Restrictive notices notwithstanding, proposals may be handled for administrative purposes by support contractors. These support contractors are prohibited from competition in DARPA technical research and are bound by appropriate non-disclosure requirements.

Subject to the restrictions set forth in FAR 37.203(d), input on technical aspects of the proposals may be solicited by DARPA from non-Government consultants /experts who are strictly bound by the appropriate non-disclosure requirements.

It is the policy of DARPA to treat all proposals as competitive information and to disclose their contents only for the purpose of evaluation. No proposals will be returned. Upon completion of the source selection process, the original of each proposal received will be retained at DARPA and all other copies will be destroyed.

## **6.0 Award Administration Information**

### **6.1 Award Notices**

As soon as the evaluation of a proposal is complete, the Proposer will be notified that 1) the proposal has been selected for funding pending contract negotiations, or 2) the proposal has not been selected. These official notifications will be sent via U. S. mail to the Technical POC identified on the proposal coversheet.

### **6.2 Administrative and National Policy Requirements**

#### **6.2.1 Security**

The Government anticipates that proposals submitted under this BAA will be unclassified, with the possible exception of an optional classified addendum for any classified information relative to a prospective payload/mission application or sensitive technology. In the event that a Proposer chooses to submit any documentation that may be classified, the following information is applicable.

If a classified addendum is submitted, it must indicate the classification level of not only the proposal itself, but also the anticipated award document classification level. It is the responsibility of the Proposer to determine and accurately annotate the proper classification level of any classified information included in a classified addendum. Classified addendums shall not exceed a total of fifty (50) pages. Addendums should follow the same format as the overall proposal with traceability to the overall design. If any portion of the proposal WBS reveals classified information, or can be analyzed to determine classified details, then that portion of the WBS must be submitted as part of the classified addendum. WBS portions in the classified addendum should be cross referenced to the parent, unclassified WBS.

Proposers recognizing that their proposal may contain, reveal, or eventually lead to the development of classified information must contact the DARPA Security Manager listed below by December 20, 2007 for further guidance on security guidance, classification level, and proposal submittal procedures.

DARPA Security Manager / Program Security Officer  
Mr. Paul F. McLean  
DARPA/TTO  
3701 N. Fairfax Drive  
Arlington, VA 22203-1714  
Tel (STE): 703-526-6708  
Fax (Secure): 571-218-4361  
Fax (Unclassified): 571-218-4379  
Email: paul.mclean@darpa.mil

Classification guidance on a DD Form 254 will not be provided at this time, since DARPA is soliciting ideas only. After reviewing the incoming proposals, if a determination is made that the award instrument may result in access to classified information, a DD Form 254 will be issued and attached as part of the award. Proposers choosing to submit a classified proposal must first receive permission from the Original Classification Authority to use their information in replying to this BAA. Applicable classification guide(s) should be submitted to ensure that the proposal is protected appropriately.

Classified submissions shall be in accordance with the following guidance:

**Collateral Classified Information:** Use classification and marking guidance provided by previously issued security classification guides, the Information Security Regulation (DoD 5200.1-R), and the National Industrial Security Program Operating Manual (DoD 5220.22-M) when marking and transmitting information previously classified by another original classification authority. Classified information at the Confidential and Secret level may only be mailed via U.S. Postal Service (USPS) Registered Mail or U.S. Postal Service Express Mail. All classified information will be enclosed in opaque inner and outer covers and double wrapped. The inner envelope shall be sealed and plainly marked with the assigned classification and addresses of both sender and addressee. The inner envelope shall be addressed to:

Defense Advanced Research Projects Agency  
ATTN: TTO  
Reference: (BAA07-65)  
3701 North Fairfax Drive  
Arlington, VA 22203-1714

The outer envelope shall be sealed with no identification as to the classification of its contents and addressed to:

Defense Advanced Research Projects Agency  
Security & Intelligence Directorate, Attn: CDR  
3701 North Fairfax Drive  
Arlington, VA 22203-1714

All Top Secret materials should be hand carried via an authorized, two-person courier team to the DARPA CDR.

**Special Access Program (SAP) Information:** Contact the DARPA Special Access Program Central Office (SAPCO) 703-526-4052 for further guidance and instructions prior to transmitting SAP information to DARPA. Top Secret SAP, must be transmitted via approved methods for such material. Consult the DoD Overprint to the National Industrial Security Program Operating Manual for further guidance. *Prior to transmitting SAP material*, it is strongly recommended that you coordinate your submission with the DARPA SAPCO.

**Sensitive Compartmented Information (SCI) Data:** Contact the DARPA Special Security Office (SSO) at 703-812-1994/1984 for the correct SCI courier address and instructions. All SCI should be transmitted through your servicing Special Security Officer (SSO). SCI data must be transmitted through SCI channels only (i.e., approved SCI Facility to SCI facility via secure fax).

**Proprietary Data:** All proposals containing proprietary data should have the cover page and each page containing proprietary data clearly marked as containing proprietary data. It is the Proposer's responsibility to clearly define to the Government what is considered proprietary data.

Proposers must have existing and in-place prior to execution of an award, approved capabilities (personnel and facilities) to perform research and development at the classification level they propose. It is the policy of DARPA to treat all proposals as competitive information, and to disclose their contents only for the purpose of evaluation. Proposals will not be returned. The original of each proposal received will be retained at DARPA and all other non-required copies destroyed. A certification of destruction may be requested, provided that the formal request is received at this office within 5 days after unsuccessful notification.

## 6.2.2 Intellectual Property

### 6.2.2.1 Procurement Contract Proposers

#### *Noncommercial Items (Technical Data and Computer Software)*

Proposers responding to this BAA requesting a procurement contract to be issued under the FAR/DFARS shall identify all noncommercial technical data and noncommercial computer software that it plans to generate, develop, and/or deliver under any proposed award instrument in which the Government will acquire less than unlimited rights, and to assert specific restrictions on those deliverables. Proposers shall follow the format under DFARS 252.227-7017 for this stated purpose. In the event that Proposers do not submit the list, the Government will assume that it automatically has “unlimited rights” to all noncommercial technical data and noncommercial computer software generated, developed, and/or delivered under any award instrument, unless it is substantiated that development of the noncommercial technical data and noncommercial computer software occurred with mixed funding. If mixed funding is anticipated in the development of noncommercial technical data and noncommercial computer software generated, developed, and/or delivered under any award instrument, then Proposers should identify the data and software in question as being subject to Government Purpose Rights (GPR). In accordance with DFARS 252.227-7013 Rights in Technical Data - Noncommercial Items and DFARS 252.227-7014 Rights in Noncommercial Computer Software and Noncommercial Computer Software Documentation, the Government will automatically assume that any such GPR restriction is limited to a period of five (5) years in accordance with the applicable DFARS clauses, at which time the Government will acquire “unlimited rights” unless the parties agree otherwise. Proposers are admonished that the Government will use the list during the source selection evaluation process to evaluate the impact of any identified restrictions and may request additional information from the Proposer, as may be necessary, to evaluate the Proposer’s assertions. If no restrictions are intended, then the Proposer should state “NONE.”

A sample list for complying with this request is as follows:

NONCOMMERCIAL			
Technical Data Computer Software To be Furnished With Restrictions	Basis for Assertion	Asserted Rights Category	Name of Person Asserting Restrictions
(LIST)	(LIST)	(LIST)	(LIST)

### *Commercial Items (Technical Data and Computer Software)*

Proposers responding to this BAA requesting a procurement contract to be issued under the FAR/DFARS shall identify all commercial technical data and commercial computer software that may be embedded in any noncommercial deliverables contemplated under the research effort, along with any applicable restrictions on the Government's use of such commercial technical data and/or commercial computer software. In the event that Proposers do not submit the list, the Government will assume that there are no restrictions on the Government's use of such commercial items. The Government may use the list during the source selection evaluation process to evaluate the impact of any identified restrictions and may request additional information from the Proposer, as may be necessary, to evaluate the Proposer's assertions. If no restrictions are intended, then the Proposer should state "NONE."

A sample list for complying with this request is as follows:

COMMERCIAL			
Technical Data Computer Software To be Furnished With Restrictions	Basis for Assertion	Asserted Rights Category	Name of Person Asserting Restrictions
(LIST)	(LIST)	(LIST)	(LIST)

#### 6.2.2.2 Non Procurement Contract Proposers - Noncommercial and Commercial Items (Technical Data and Computer Software)

Proposers responding to this BAA requesting an Other Transaction for Prototype shall follow the applicable rules and regulations governing these various award instruments, but in all cases should appropriately identify any potential restrictions on the Government's use of any Intellectual Property contemplated under those award instruments in question. This includes both Noncommercial Items and Commercial Items. Although not required, Proposers may use a format similar to that described in Paragraphs 1.a and 1.b above. The Government may use the list during the source selection evaluation process to evaluate the impact of any identified restrictions, and may request additional information from the Proposer, as may be necessary, to evaluate the Proposer's assertions. If no restrictions are intended, then the Proposer should state "NONE."

#### 6.2.2.3 All Proposers – Patents

Include documentation proving your ownership of or possession of appropriate licensing rights to all patented inventions (or inventions for which a patent application has been filed) that will be utilized under your proposal for the DARPA program. If a patent application has been filed for an invention that your proposal utilizes, but the application has not yet been made publicly available and contains proprietary information, you may provide only the patent number, inventor name(s), assignee names (if any), filing date, filing date of any related provisional

application, and a summary of the patent title, together with either: 1) a representation that you own the invention, or 2) proof of possession of appropriate licensing rights in the invention.

#### **6.2.2.4 All Proposers-Intellectual Property Representations**

Provide a good faith representation that you either own or possess appropriate licensing rights to all other intellectual property that will be utilized under your proposal for the DARPA program. Additionally, Proposers shall provide a short summary for each item asserted with less than unlimited rights that describes the nature of the restriction and the intended use of the intellectual property in the conduct of the proposed research.

### **6.2.3 Meeting and travel requirements**

There will be a program kickoff meeting and all key participants are required to attend. Performers should also anticipate periodic site visits at the Program Manager's discretion.

#### **6.2.4 Human Use**

Proposals selected for contract award are required to comply with provisions of the Common Rule (32 CFR 219) on the protection of human subjects in research (<http://www.dtic.mil/biosys/downloads/32cfr219.pdf>) and the Department of Defense Directive 3216.2 (<http://www.dtic.mil/whs/directives/corres/html2/d32162x.htm>). All proposals that involve the use of human subjects are required to include documentation of their ability to follow Federal guidelines for the protection of human subjects. This includes, but is not limited to, protocol approval mechanisms, approved Institutional Review Boards, and Federal Wide Assurances. These requirements are based on expected human use issues sometime during the entire length of the proposed effort.

For proposals involving “greater than minimal risk” to human subjects within the first year of the project, performers must provide evidence of protocol submission to a federally approved IRB at the time of final proposal submission to DARPA. For proposals that are forecasted to involve “greater than minimal risk” after the first year, a discussion on how and when the Proposer will comply with submission to a federally approved IRB needs to be provided in the submission. More information on applicable federal regulations can be found at the Department of Health and Human Services – Office of Human Research Protections website (<http://www.dhhs.gov/ohrp/>). Any aspects of a proposal involving human use should be specifically called out as a separate element of the statement of work and cost proposal to allow for independent review and approval of those elements.

### **6.2.5 Animal Use**

Any Recipient performing research, experimentation, or testing involving the use of animals shall comply with the rules on animal acquisition, transport, care, handling, and use in: (i) 9 CFR parts 1-4, Department of Agriculture rules that implement the Laboratory Animal Welfare Act of 1966, as amended, (7 U.S.C. 2131-2159); and (ii) the guidelines described in National Institutes of Health Publication No. 86-23, "Guide for the Care and Use of Laboratory Animals."

### **6.2.6 Publication Approval**

Any award resulting from such a determination will include a requirement for DARPA permission before publishing any information or results on the program.

The following provision will be incorporated into any resultant procurement contract or Other Transaction for Prototype:

When submitting material for written approval for open publication as described in subparagraph (a) above, the Contractor/Awardee must submit a request for public release to the DARPA TIO and include the following information: 1) Document Information: document title, document author, short plain-language description of technology discussed in the material (approx. 30 words), number of pages (or minutes of video) and document type (briefing, report, abstract, article, or paper); 2) Event Information: event type (conference, principle investigator meeting, article or paper), event date, desired date for DARPA's approval; 3) DARPA Sponsor: DARPA Program Manager, DARPA office, and contract number; and 4) Contractor/Awardee's Information: POC name, e-mail and phone. Allow four weeks for processing; due dates under four weeks require a justification. Unusual electronic file formats may require additional processing time. Requests can be sent either via e-mail to [tio@darpa.mil](mailto:tio@darpa.mil) or via 3701 North Fairfax Drive, Arlington VA 22203-1714, telephone (571) 218-4235. Refer to [www.darpa.mil/tio](http://www.darpa.mil/tio) for information about DARPA's public release process.

### **6.2.7 Export Control**

Should this project develop beyond fundamental research (basic and applied research ordinarily published and shared broadly within the scientific community) with military or dual-use applications, the following apply:

(1) The Contractor shall comply with all U. S. export control laws and regulations, including the International Traffic in Arms Regulations (ITAR), 22 CFR Parts 120 through 130, and the Export Administration Regulations (EAR), 15 CFR Parts 730 through 799, in the performance of this contract. In the absence of available license exemptions/exceptions, the Contractor shall be responsible for obtaining the appropriate licenses or other approvals, if required, for exports



(including deemed exports) of hardware, technical data, and software, or for the provision of technical assistance.

(2) The Contractor shall be responsible for obtaining export licenses, if required, before utilizing foreign persons in the performance of this contract, including instances where the work is to be performed on-site at any Government installation (whether in or outside the United States), where the foreign person will have access to export-controlled technologies, including technical data or software.

(3) The Contractor shall be responsible for all regulatory record keeping requirements associated with the use of licenses and license exemptions/exceptions.

(4) The Contractor shall be responsible for ensuring that the provisions of this clause apply to its subcontractors.

### **6.2.8 Subcontracting**

Pursuant to Section 8(d) of the Small Business Act (15 U.S.C. 637(d)), it is the policy of the Government to enable small business and small disadvantaged business concerns to be considered fairly as subcontractors to contractors performing work or rendering services as prime contractors or subcontractors under Government contracts, and to assure that prime contractors and subcontractors carry out this policy. Each Proposer who submits a contract proposal and includes subcontractors is required to submit a subcontracting plan in accordance with FAR 19.702(a) (1) and (2) should do so with their proposal. The plan format is outlined in FAR 19.704.

Participation by foreign persons or foreign corporations in the FAST program is allowed, but must meet all the requirements specified in Section 6.2.7 of the BAA (“Export Control”), as well as all applicable US export control laws and regulations, including the International Traffic in Arms Regulations and the Export Administration Regulations. DARPA recognizes that some contractor teams depend upon the procurement of elements of their proposed system from foreign suppliers in order to minimize costs and access expertise in the global marketplace. However, contractor teams that advocate technology development at foreign locations or by foreign personnel must demonstrate their ability to satisfy the laws and regulations mentioned above. Contractor teams should also be aware that during future phases of the program, if the development of any new technologies is deemed to require security classification, the contractor will be expected to develop a plan which demonstrates the ability of their personnel, facilities and processes to conform to applicable security regulations for classified material handling.

### **6.3 Reporting**

The number and types of reports will be specified in the award document, but will include as a minimum monthly technical and financial status reports. The reports shall be prepared and submitted in accordance with the procedures contained in the award document and mutually

agreed on before award. Reports and briefing material will also be required as appropriate to document progress in accomplishing program metrics. A Final Report that summarizes the project and tasks will be required at the conclusion of the performance period for the award, notwithstanding the fact that the research may be continued under a follow-on vehicle.

The Government anticipates holding informal monthly status teleconferences. The objective of these telecons is to allow coordination of Government objectives and Contractor activities. Prior to the telecons, the contractor will forward an electronic copy to the DARPA PM of a concise report outlining progress made since the preceding telecon, suggested topics of discussion, and critical technical challenges to be faced before a subsequent telecon. The telecons provide an opportunity for the Government to view program progress and provide additional insight or information as required. The value of the meetings will be in the breadth of material and level of detail and interaction with the team.

### **6.3.1 Central Contractor Registration**

Selected Proposers not already registered in the Central Contractor Registry (CCR) will be required to register in CCR prior to any award under this BAA. Information on CCR registration is available at <http://www.ccr.gov>.

### **6.3.2 Representations and Certifications**

In accordance with FAR 4.1201, prospective Proposers shall complete electronic annual representations and certifications at <http://orca.bpn.gov>.

### **6.3.3 Wide Area Work Flow (WAWF)**

Unless using another approved electronic invoicing system, performers will be required to submit invoices for payment directly via the Internet/WAWF at <https://wawf.eb.mil>. Registration to WAWF will be required prior to any award under this BAA.

## **7.0 Agency Contacts**

DARPA will use electronic mail for all technical and administrative correspondence regarding this BAA, with the exception of selected/not-selected notifications.

Administrative, technical or contractual questions should be sent via e-mail to BAA07-65@darpa.mil. All requests must include the name, email address, and phone number of a point of contact.

Points of Contact:

The technical POC for this effort is Lt. Col. Fred Kennedy.

The contractual POC for this effort is Chris Glista.

Electronic mail: [BAA07-65@darpa.mil](mailto:BAA07-65@darpa.mil).

DARPA/TTO

ATTN: BAA 07-65

3701 North Fairfax Drive

Arlington, VA 22203-1714

DARPA may post updates to questions or comments periodically to the solicitation website:  
<http://www.darpa.mil/tto/solicit/FAST/index.cfm>

## **8.0 Program Description and Objectives**

### **8.1 Program Plan**

The FAST program will be accomplished through a two phase program culminating in an end-to-end ground testing of the HPGS. Multiple awards for simultaneous execution by competing contractor teams are expected. Transition to Phase 2 will incorporate competitive down selects in the number of Contractor teams, based on the technical merit of the work performed, an assessment of the ability of each Contractor team to successfully achieve program goals by program end, and overall program budget constraints. As a minimum, each performer must meet the phase specific go/no-go metrics defined in Section 8.3.5 in order to qualify to compete for selection to Phase 2. Timely and successful completion of Phase 1 will also be key considerations.

Phase 1 will consist of the completion of a detailed prototype design for ground test demonstration, along with a full simulation of the HPGS performance, including solar concentration, power conversion, heat rejection, structure and deployment, along with sun pointing and tracking capability. Phase 1 will conclude with a design review to evaluate the results of Phase 1 efforts and to review the Contractor's detailed proposal for Phase 2.

Phase 2 will include the fabrication, assembly and testing of the prototype HPGS in a representative environment. This phase will also include the fabrication and ground testing of the full scale solar concentrator deployment mechanism. Phase 2 will conclude with delivery of a final test report and a program review to assess the performance testing results. The final program review will include a discussion of potential program transition partners and the potential for follow-on activities including the integration of the HPGS into a complete spacecraft system for on-orbit demonstration.

### **8.2 Program Objectives**

The objectives of the FAST program are as follows:

#### **8.2.1 HPGS Preliminary Design**

Complete the HPGS preliminary design. The completed design will be capable of generating 20 kW of power with a minimum specific power of 130 W/kg. Total system mass (and specific power calculations) will include solar concentration and collection, power conversion, power management and distribution, heat rejection, structures and deployment elements, along with necessary sun pointing and tracking mechanisms.

#### **8.2.2 HPGS Simulation Demonstration**

Demonstrate through simulation the performance of a complete HPGS, including solar concentration, power conversion, heat rejection, structure and deployment, along with sun

pointing and tracking capability. The simulation should analytically verify the system capability of 20 kW power generation with a minimum specific power of 130 W/kg while continuously maintaining the subsystem components within their operating temperature limits for a duration of no less than 30 days.

### **8.2.3 Demonstration of Integrated HPGS**

Successfully demonstrate the performance of the integrated HPGS, including solar concentration, power conversion, and heat rejection. This demonstration will be accomplished through end-to-end system ground testing in a representative thermal vacuum environment with a solar simulator. Testing can be accomplished using a full-scale subset of the complete system with extrapolation to the complete full scale system performance.

### **8.2.4 System Mechanical Deployment Demonstration**

Demonstrate the mechanical deployment of the complete full scale solar concentrator and heat rejection system in 1 g. The demonstration will incorporate a means to compensate for the 1g environment.

### **8.2.5 Phase 1 Go/No-Go Metrics**

To be considered for selection for Phase 2, the following measures will be used to assess Phase 1 program performance:

- 1) Ground test prototype design complete.
- 2) Verify through simulation that the integrated HPGS design is capable of generating a minimum of 20 kW electric power on orbit.
- 3) Verify through simulation that the integrated HPGS design is capable of generating a minimum specific power of 130 W/kg on orbit.
- 4) Demonstrated scalability of the 20 kW HPGS design to 50-80 kW or higher, at 130 W/kg.

## **8.3 Government Management Approach**

The DARPA Program Manager (PM) shall be the technical management authority for this effort. The DARPA PM will convene a Management Team which will consist of appropriate experts from governmental and non-governmental organizations to assist the PM with Contractor oversight, monitoring of technical progress, independent verification and validation, risk management, and liaising with potential transition partners. Additionally, DARPA may enter into various agreements with other governmental or non-governmental organizations for the furtherance of FAST program goals and objectives.